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AUTHOR Emanuelsson, Ingemar; Svensson, Allan
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ABSTRACT

This study investigated possible changes in verbal, spatial, and reasoning intelligence in Swedish 13-year-olds over a 20-year period. The first sample included about 12,000 students born in 1948. Data consisted of (1) information from school records, (2) information on personal background, (3) scores on three intelligence tests and three standardized achievement tests, and (4) replies to questionnaires on pupil attitudes and interests. Students born in 1953 provided similar material for the second set of data. In 1980, a two-step sampling design was used: (1) A stratified sample of 29 out of 277 local communities was drawn. (2) From these communities, a systematic sample of classes from grade six, mostly students born in 1967, was selected. Comparisons were made by year of testing, by sex, and by blue- or white-collar status. Results showed that the average level of spatial and reasoning intelligence had risen over 20 years. Verbal intelligence increased during the 1960's but declined later. Changes in performance were noted between sexes, but not between social groups. Girls advanced more than boys in the verbal test from 1961 to 1980, and overcame the boys' lead in spatial and reasoning ability. (LMO)

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A comparison between thirteen-year-olds tested in 1961, 1966 and 1980

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Report no. 1985:02
Department of Education and
Educational Research
University of Göteborg

UNIVERSITY OF GÖTEBORG
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DOES THE LEVEL OF INTELLIGENCE DECREASE?

A comparison between thirteen-year-olds tested in 1961, 1966 and 1980.

Ingemar Emanuelsson Allan Svensson

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ABSTRACT

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The purpose of the investigation is to study possible changes in verbal, spatial and reasoning intelligence during a 20-year period. This is possible to do because we have access to test results from representative samples of Swedish thirteen-year-olds who have been given identical tests in 1961, 1966 and 1980.

The results show that the average level of spatial and reasoning intelligence has successively risen among Swedish thirteen-year-olds during the past 20 years. Concerning verbal intelligence, there is a clear increase during the beginning of the 1960:ies. After this period, a certain decrease can be noted.

Regarding the differences between youngsters from different social groups, no particular changes seem to have occured. The differences in 1980 are of about the same size as those which were recorded 20 years earlier. This is a consequence of the fact that the groups show similar developmental trends, which means that the initial differences were barely influenced.

Although there were no changes in differences between social groups, the opposite was the case concerning differences between boys and girls. In the verbal test, there were hardly any differences between the sexes in 1961. However, in 1980, the girls were clearly ahead of the boys. Concerning spatial and reasoning ability, the boys were clearly better at the beginning of the 1960:ies. 20 years later, this difference had pracically disappeared.

In the last chapter, factors which could have caused these changes in test results are discussed. Thus certain factors are mentioned which have led to a more general increase in spatial and reasoning intelligence, but which have had a more negative influence on verbal intelligence. We also try to explain why there are such large changes in differences between the sexes, while at the same time there are no changes in the socially influenced differences in intelligence.

Can be ordered from:

Department of Education and Educational Research
University of Göteborg
Box 1010
S-431 26 Mölndal
Sweden

BACKGROUND AND AIMS

Tests for estimating mental ability have been in use since the beginning of the 20th century. Ever since then, there has been a lively discussion about intelligence development. More precisely, the question of whether the level of intelligence among children and youth is falling or rising has been continously discussed since the 1930:ies. We have no possibilities here of going into further details from this debate. Instead, we refer to an excellent over-view presented by Stahle (1973). However, we would like to point out that the most important reason for this long debate is that it is extremely difficult to get empirical evidence about the real course of developmental processes. To acquire such evidence, you must have access to test results from a long period of time. You also need test results from large and representative samples of youngsters who have been tested at the same age and with identical tests on different occasions. These conditions are very difficult to meet.

In spite of the fact that the conditions mentioned almost never have been fulfilled, many investigations are reported of attempts to clarify the general trend in changing level of intelligence over time. A closer look at these studies will show that the results differ. However, most of them indicate a slow but increasing average level of mental ability up to the beginning of the 1960:ies. Better and longer education, extended availability of cultural activities, and a rising level of living standards are put forward as explanatory factors to this.

In the Individual Statistics Project (see p 3 for further presentation), it has been possible to make close and accurate studies of changes in average mental ability in Sweden. Comparative studies have been made of thirteen-year-old youngsters in 1961 and 1966 (Svensson, 1971; Stahle, 1973; Härnqvist & Stahle,

1977). Reported results are positive in as much as average performance on the three factor tests (verbal, spatial and reasoning) rose. Average scores increased slightly more for girls than for boys, and more among students from rural areas than from big cities. These results can be explained by two important events which occured during the first half of the 1960:ies in Sweden. These are the successive establishment of the nine year compulsory and comprehensive school (grundskolan), and the extended availability of TV.

Until the middle of the 1960:ies, average mental ability seems to have risen among Swedish youth. What has happened since then? We don't know. However, there are some alarming reports on a decreasing level of mental ability during the 1970:ies from the USA (Flanagan, 1976; Harnischfeger & Wiley, 1976). Is such a decreasing trend valid also for Sweden? The aim of this study is to answer that question. In other words, our purpose is to investigate changes, if any, in verbal, spatial and reasoning ability during a 20-year period. This is possible because test results are available from representative samples of Swedish thirteen-year-olds tested with identical tests in 1961, 1966 and 1980. We will especially study which changes have occurred concerning differences between boys and girls and differences between youngsters from different social backgrounds. These changes are of great interest. This is especially the case when one considers the different social renewal programmes which were introduced at that time, in schools and elsewhere, in order to promote an increasing equality between the sexes and between groups from different cultural and economical backgrounds.

SAMPLES AND VARIABLES

Three sets of data are used in the study.

Students born in 1948

come from the first data bank of the Individual Statistics Project. This project started in 1961 and then included all Swedes born on the 5th, 15th and 25th of any month in 1948. The sample includes a total of some 12.000 individuals, about ninety per cent of whom were in the sixth grade within the compulsory school system on the first occasion when data were collected.

The basic data collected on the first occasion consists of:

I Information from the school records, e g class, type of class and school marks.

II Information on personal background, such as parents' occupations and education.

III Scores on three intelligence tests and three standardized achievement tests.

IV Replies to questionnaires on the pupils' attitudes to school, their spare time interests, and plans for study and work.

Students born in 1953

are taken from the second data bank of the Individual Statistics Project, which was a repetition five years later of the procedure just described.

Students born in 1967

are taken from the first data bank of the UGU-project. In this case the first data collections took place during the spring of 1980. A two-step sampling design was used. First, a stratified

sample of 29 out of all 277 local communities in Sweden was drawn. From these communities a systematic sample of classes from grade six was selected. The investigation group thus consists of the circa 10.000 students belonging to these classes. This is close to ten per cent of the year-group in the compulsory school. Most of them were born in 1967.

The data collected for this project is of the same type as the data included in the Individual Statistics Project.

We have given a very short description of the projects. Additional information on the Individual Statistics Project may be found in Härnqvist & Svensson (1973). The UGU-project is reported in detail by Emanuelsson (1983).

Due to the different techniques of sampling used in the two projects it will be neccessary to restrict the study to pupils of normal age for their grades, and who, when data were collected, were attending sixth grade classes in the compulsory school. This restriction, however, does not reduce the size of the samples very much - as the "normal-age" pupils amount to about 90 per cent or more of the age cohorts.

Table 1: *A survey of methods of sampling, definitions and sizes of samples.*

Cohort	The sample drawn in	The sample consists of	Total number of students	Definition of a "normal age" student	Number of "normal age" students	Proportion of "normal-age" students
1948	spring 1961	1/10 of all Swedes born in 1948	12.166	belongs to grade 6 in 1961	10.680	87.7%
1953	spring 1966	1/10 of all Swedes born in 1953	10.723	belongs to grade 6 in 1966	9.661	90.1%
1967	spring 1980	all students in classes chosen from grade 6 in spring 1980	9.108	born in 1967	8.702	95.5%

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The number of individuals in the three samples to be included in this investigation is shown in table 2. This table also reports how the samples were reduced by various types of drop-outs.

Table 2: *Number of students included in the investigation and different types of drop-outs*

	Cohort					
	1948		1953		1967	
	Number	%	Number	%	Number	%
Students included in the investigation	9.196	*86*	8.521	*88*	6.717	*77*
Drop-outs I Intelligence data not available	1.043	*10*	873	*9*	875	*10*
Drop-outs II Background data not available	441	*4*	267	*3*	1.110	*13*
Total number of "normal-age" students in the sample	10.680	*100*	9.561	*100*	8.702	*100*

"Drop-out group I" consists of pupils without scores on intelligence tests. In most cases, absence from school on the days of testing accounts for these drop-outs. There is no reason to suspect that these pupils differed in any important way from the pupils included in the investigation.

"Drop-out group II" includes pupils who have given incomplete information about their father's occupation. Unlike the prevoius group of drop-outs, it cannot be assumed that these drop-outs are a random sample. Most of these pupils gave information about their mother's education and occupation which suggests that children living with the mother as an only parent are over-represented among these drop-outs. As can be seen from the table, this type of drop-outs is larger in the youngest cohort.

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A likely explanation for this is that the proportion of youngsters not living with their biological father has increased considerably during the last twenty years. Nevertheless, we have no reason to believe that these pupils deviate more than pupils included in the study concerning variables that are important in this investigation (sex, social background or intelligence).

One of the purposes of the present investigation is to find out whether the differences in test results between social groups have changed during the period studied. To make this possible, groups in the investigation have been divided according to social background - more precisely according to father's occupation. We made only a crude division into two groups called "students from blue-collar homes" and "students from white-collar homes", (pupils whose father is a worker, and pupils whose father is a professional, a civil servant, etc).

Only dichotomizing social background leads to several advantages. This type of division is easy to make and, what is more important, it can be made exactly the same in the three cohorts. A more detailed classification is hard to make, because of different occupation-codes used in the two projects. There seems to be no reason either for trying to attain a very detailed categorization. This would result in some social groups being too small to be used in the following comparisons.

Table 3 shows how the pupils in the samples are distributed according to sex and social background. The distributions are very even for both of these variables. The proportion of boys varies between 49 and 51 per cent. In the oldest cohort, 50 per cent are students from blue-collar homes, while 49 per cent are students from blue-collar homes in the two other cohorts.

Table 3: *Sex and social background of the investigation groups.*

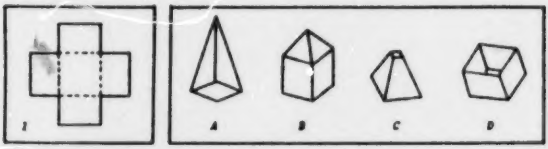
Year of birth	Year of testing	Students from blue collar homes			Students from white collar homes		
		Boys	Girls	Total	Boys	Girls	Total
1948	1961	2.261	2.352	4.613	2.354	2.229	4.583
1953	1966	2.120	2.053	4.173	2.153	2.195	4.348
1967	1980	1.705	1.606	3.311	1.667	1.739	3.406

The young people in the three cohorts have been tested with identical intelligence tests.

The tests that were used in the investigation represent the verbal, spatial, and reasoning factors of intelligence according to a Thurstonian classification of abilities. The tests are called Opposites, Metal Folding, and Number Series.

Opposites: To find the opposite of a given word among four choices. 40 items, 10 minutes.
Example: ANONYMOUS: passed, well-known, famous, colourful.

Metal Folding: To find the three-dimensional object among four choices that can be made from a flat piece of metal with bending lines marked on the drawing. 40 items, 15 minutes.



Number series: To complete a number series, of which six numbers are given, with two more numbers. 40 items, 18 minutes.
Example: 5, 7, 11, 17, 25, 35 __ __

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Some statistical data about the tests are reported in table 4. These data are valid for pupils tested in 1961.

Table 4: *Means, standard deviations and reliabilities of the three tests. Students tested in 1961.*

Test	N	Means	SD	r_{tt}
Opposites	40	22.88	6.56	.87
Metal foldings	40	21.41	7.05	.88
Number series	40	19.41	7.62	.92

As is shown, all the means are fairly near the midpoint of the possible score range. The standard deviations are of equal size and the reliabilities are approximately .90, calculated according to the Kuder-Richardson formula 20.

Means and standard deviations of the test OPPOSITES for boys and girls from different social backgrounds tested in 1961, 1966 and 1980 are found in table 5.

Corresponding data for the tests METAL FOLDING and NUMBER SERIES are shown in table 6 and 7.

Table 5: *Means and standard deviations of the verbal test. Students tested in 1961, 1966 and 1980 divided according to sex and social background.*

Year of testing	Boys				Girls			
	Blue collar		White collar		Blue collar		White collar	
	Means	SD	Means	SD	Means	SD	Means	SD
1961	21.27	6.42	23.74	6.77	21.17	6.54	24.03	6.99
1966	22.73	6.20	25.24	6.31	22.99	6.31	25.35	6.54
1980	21.71	5.57	24.18	5.57	22.29	5.83	24.92	5.76

Table 6: *Means and standard deviations of the spatial test. Students tested in 1961, 1966 and 1980 divided according to sex and social background.*

Year of testing	Boys				Girls			
	Blue collar		White collar		Blue collar		White collar	
	Means	SD	Means	SD	Means	SD	Means	SD
1961	21.08	7.51	22.93	7.23	19.53	6.77	21.28	6.78
1966	21.90	7.40	23.68	7.40	21.06	7.05	22.29	6.83
1980	22.99	7.41	24.99	7.13	22.61	6.99	24.76	6.63

Table 7: *Means and standard deviations of the reasoning test. Students tested in 1961, 1966 and 1980 divided according to sex and social background.*

Year of testing	Boys				Girls			
	Blue collar		White collar		Blue collar		White collar	
	Means	SD	Means	SD	Means	SD	Means	SD
1961	18.81	7.87	21.22	7.72	17.88	7.61	20.68	7.51
1966	19.42	7.89	22.13	7.84	19.17	7.52	21.56	7.67
1980	21.30	8.15	24.56	7.97	21.41	7.62	24.19	7.60

It is rather difficult to get a picture of the data that we have given so far. Therefore, to make the results easier to interpret, we will give the differences between the means in SD-units on each test.

Example: In 1961, the mean of the test Opposites was 21.27 for boys from blue-collar homes. In 1966, this mean had increased to 22.73. The difference between the two means is as much as 1.46. This difference has been divided with 6.56, the standard deviation in the verbal test in 1961 (cf table 4). The quotient is .22, which means that the results for this category of pupils increased during the 5-year-period with roughly one fifth of a standard deviation unit.

Table 8: *Changes in test results among 13-years-olds.*

Test	Difference	Boys		Girls	
		Blue collar	White collar	Blue collar	White collar
Opposites	1966-61	.22	.23	.28	.20
	1980-66	-.16	-.16	-.11	-.07
	1980-61	.07	.07	.17	.14
Metal foldings	1966-61	.12	.11	.22	.14
	1980-66	.15	.19	.22	.35
	1980-61	.27	.29	.44	.49
Number series	1966-61	.08	.12	.17	.12
	1980-66	.25	.32	.29	.35
	1980-61	.33	.44	.46	.46

To be significant ($p < .05$) a difference has to be at least 0.07 units. It implies that all the differences are significant.

The trends shown in table 8 are very regular. In all groups there are higher results in 1966, compared with 1961 in the verbal test. After this the means in this test decrease everywhere between 1966 and 1980. However, the decrease is rather weak and therefore the net difference between 1961 and 1980 still remains positive.

In the other two tests, all differences are positive and, with a few exceptions, larger between 1966 and 1980 than between 1961 and 1966. Thus, concerning spatial and reasoning ability, the average level has increased successively among Swedish thirteen-year-olds during the last 20 years. Concerning verbal ability there is a clear increase during the beginning of the sixties, after which there is a slight decrease. The trends are illustrated in figure 1 and 2.

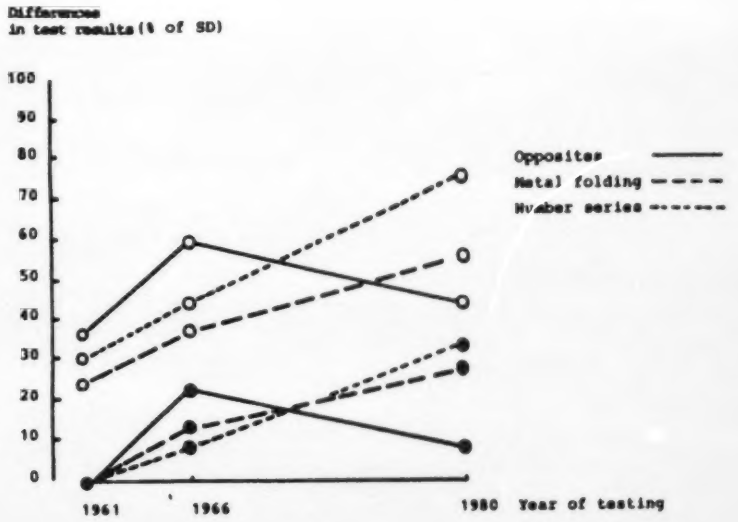

Figure 1: *Changes in test results among 13-year-old boys between 1961 and 1966. Black circles indicate means for boys from blue-collar homes and unfilled circles means for boys from other homes. The reference-point is the values of the working-class boys in 1961.*

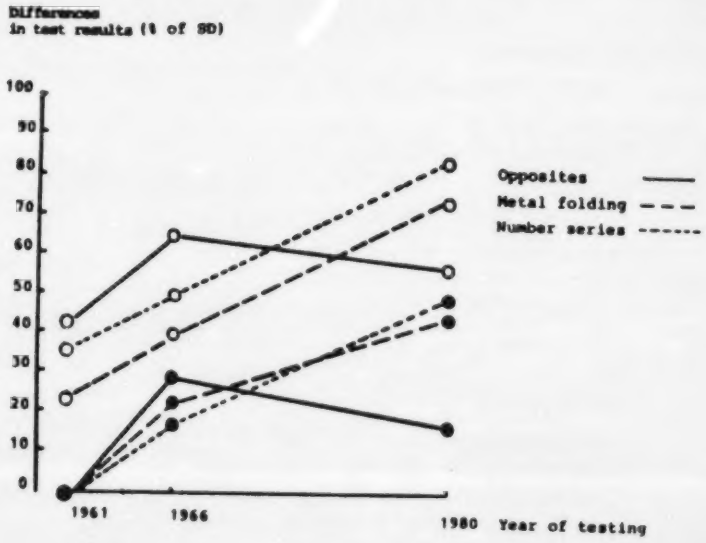

Figure 2: *Changes in test results among 13-year-old girls between 1961 and 1966. Black circles indicate means for girls from blue-collar homes and unfilled circles means for girls from other homes. The reference-point is the values of the working-class girls in 1961.*

First we have drawn the curves for the boys (figure 1) and for the girls (figure 2) from the working class. The curves for the other students have been constructed by paying consideration to the initial differences, i e the differences between the means existing in 1961. As can be observed from the shape of the curves, as well as from the numerical values in table 9, no dramatical changes have taken place according to the differences between the social groups. They are more and less as large in 1980 as 20 years earlier. This is caused by the social groups showing almost the same development. Consequently the initial differences are kept nearly unchanged.

Table 9: *Differences between social groups on the three tests in 1961, 1966 and 1980 among boys and girls respectively. Unit of measurement: The standard deviation of each test in 1961.*

Year of testing	Opposites		Metal foldings		Number series	
	Boys	Girls	Boys	Girls	Boys	Girls
1961	.38	.44	.26	.25	.32	.37
1966	.38	.36	.25	.18	.36	.31
1980	.38	.40	.28	.30	.43	.36

Although there were no changes of differences between social groups, this is the case if we look at differences between boys and girls. In the verbal test, differences between the sexes were very small and insignificant in 1961, but in 1980 the girls show significantly higher means. In spatial and reasoning ability, the boys were superior in the beginning of the sixties - 20 years later their superiority has disappeared.

Table 10: *Differences between the sexes on the three tests within different social groups in each. Unit of measurement: The standard deviation of each test in 1961.*

Year of testing	Opposites		Metal foldings		Number series	
	Blue collar	White collar	Blue collar	White collar	Blue collar	White collar
1961	-.02	+.04	-.22	-.23	-.12	-.07
1966	+.04	+.02	-.12	-.20	-.03	-.07
1980	+.09	+.11	-.05	-.03	+.01	-.05

Thus, there has been an increase in the results for girls, but not for boys during the time that we have studied. This is illustrated in figure 3, where we report which of the sex differences are significant and in what direction.

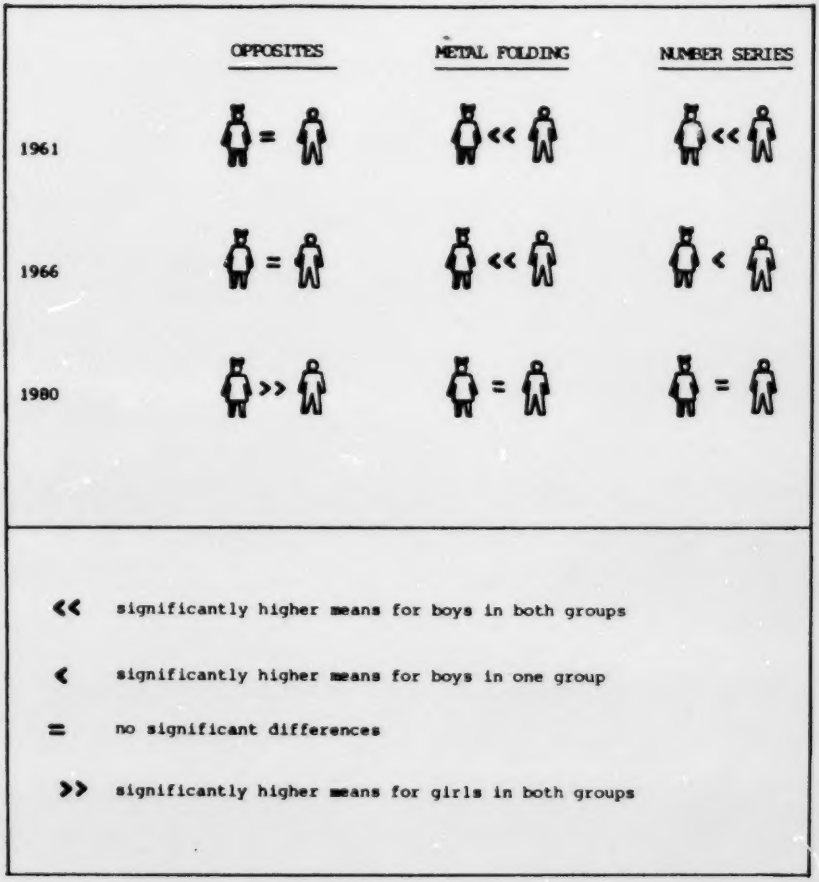

Figure 3: *Differences between boys and girls on the three tests in 1961, 1966 and 1980.*

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In the following section we are going to discuss the conditions which may have caused the changes in test results - conditions which have brought about a general rise in spatial and reasoning ability, but which have had a less favourable influence on verbal ability. Further on, we will try to explain why the differences between the sexes have changed, but not the differences between social groups.

DISCUSSION

The results that we have presented here lead to a number of questions. One of these is why the results from the verbal test have a pattern that differs from the other two tests. In order to find out possible reasons for this, we have looked at item-analysis data from 1961 and 1980. We find that there are some items that have lower proportions of right answers in 1980 compared to 1961, but there are other items that have higher proportions of right answers in 1980 as well.

Ten out of the total of 40 items of the verbal test have a more than five per cent increase in proportion of right answers in 1980. Nine have decreased their proportion in at least the same amount. Most of the items with increased proportions may be classified as foreign words that Swedish has borrowed from other languages. Those with a decreased proportion of right answers are very often older words probably used more in common talk and texts in the 1960:ies than in the 80:ies. This can be said to illustrate one big difficulty in testing changes in verbal ability over historical time: If you use words and expressions from common language on different occasions in history, you must calculate with the possibility that the "language itself" has changed during the period of study.

Another reason for the deviant results of the verbal test may be the fact, that the number of immigrant children is higher in the 1980 sample, than in the earlier ones. It is reasonable to expect them to have more difficulties than native born children, especially with difficult items concerning unusual or "odd" words. The differences between the three cohorts according to proportions of immigrant children are not big enough, however, for this fact alone to give an explanation for the deviant result pattern of the verbal test.

Referring to what is said above, we dare to say that we hardly believe in a real decrease in word knowledge as such or in verbal ability as well as mental ability in any factor among Swedish youth during the past 15 years. The lower results on the verbal test (Opposites) must be caused by qualities connected to the words used as items. We therefore put more trust in the results on the other two less "culture-dependant" spatial and reasoning tests. The results from these two tests show a successive and continous increase in what may be called mental ability.

What could then be reasons for such an increase in mental ability over a period of the past 20 years? The possibilities of giving a full answer to this question are limited. We will just point out some circumstances that doubtless must be of great importance for changes in mental ability.

First of all, we may conclude, that the results on the three tests that we have used are, as may be said of almost all intelligence tests, related to a certain degree to the individuals´ amount and kind of schooling. There are no differences in the amount of schooling between the three samples in this study. They had all had almost six years of schooling at the time they were tested. However, there were some differences in the types of schools they attended. Individuals born in 1948 (tested in 1961) attended either elementary school (folkskola) or a so called experimental comprehensive school (enhetsskola). Most of the individuals in the 1953 cohort (tested in 1966) attended the comprehensive school (grundskola) established according to the new school law and curriculum from 1962. In some communes, though, the old system with an elementary school was still in operation. The 1967 cohort (tested in 1980) all belonged to the comprehensive school with the curriculum that was revised in 1969.

Even if the differences between the curricula are not too big during the first six years of schooling, we think that they might have had an influence on the students´ ability to answer the test items. This is probably especially true for girls, a fact we will discuss in further detail below. We think that both organizational

and other curriculum-based aspects may be of interest in this respect. Of course, it is not possible to make more exact estimations of the amount of influence that could have been caused by these curriculum changes.

Concerning the influence of schooling, one must not forget the importance of pre-school experiences. The 1967-born youngsters had had such experiences to a much higher degree than those born earlier. Even if most of them just spent a small amount of time in pre-schools - as a rule three hours a day for one year - this happened during a most important period in their development.

There is one more factor, concerning schooling and education that is of importance. That is the parents´ level of education. Parents of the students in the oldest cohort are as an average born 20 years earlier than those of the youngest. This means then, that the latter (most of them born in the 1930:ies and 1940:ies) have had a longer and more extensive education. A greater number of them have also had more extensive secondary and/or higher education. This might mean then that they have had better possibilities of creating a more stimulating cultural and intellectual climate at home, which in turn also might influence their children´s performance ability on both achievement and mental tests (c f Svensson, 1971, p 26 and Stahle, 1973, p 221).

However, the most interesting findings in our study are not the increases in test results from 1961 to 1980. What is more interesting is that the differences between the two sexes according to the results on the tests have changed during this period. It is also of great interest to note that comparable differences between social groups have not changed at all during the same period. We can find no clear explanations for these results. The following discussion may thus be seen as highly speculative. We would also like to emphasize the need for further research in this area.

In Sweden during the 1960:ies and 1970:ies, several measures have been taken in order to achieve more equal conditions for the sexes. This has been the case in both educational and labour market politics. Reforms have also been carried out in the area of family politics. There have been a number of discussions and debates at different levels in the Swedish society about equalizing conditions for the sexes. Boys and girls have been given better opportunities to take part in the same types of play, have had the same kinds of toys and so forth.

The Swedish pre-school has probably also been an important factor for equalizing the conditions concerning the two sexes. Boys and girls have more chances in pre-schools of taking part in common activities than they would have had elsewhere. In addition, these activities often aim at stimulating development of attitudes and values of importance for more equalized conditions. This has also been a more and more important area of school work, stressed in the curricula. One example of this could be the fact that wood-craft is obligatory nowadays also for girls in the compulsory school. This might be of importance for girls' ability to answer spatial test items.

The examples that we have mentioned above may all be considered as facts that can have contributed to changed differences between the sexes on test performances, as reported in this comparative study. Differences on typical "boy"-tests have vanished. On the other hand, the results do not explain why the differences in favour of the girls on the verbal test were even bigger during the same period of time.

In an attempt to explain this and the very good performance of girls also on the other tests, we wish to refer to some suggested explanations in the following paragraphs.

First of all, we want to point out that the rising level of ability that we have seen among the thirteen-year-olds, does not necessarily mean that the adult level of intelligence has

risen correspondingly. It may just be a sign that the maturation process in mental ability develops more rapidly nowadays compared to formerly. The positive trend for test results among thirteen-year-old youngsters corresponds well with a similar pattern that has been found in other measures of development and maturation, for example height and mental ability. These more rapidly developing processes are often taken as signs of trends over long period of time, so called secular trends (see e g Ljung et al, 1974; Lindgren, 1979). These secular trends are characterised by an earlier maturation and are usually supposed to be connected with or related to common changes in society, primarily with changed living conditions and a higher level of living standards in western societies.

The trend of receiving higher test results which is obvious when we look at our data, may probably be explained in a similar way. For instance, the increasing availability of information and media, leading to stimulating intellectual experiences, must be of importance in this respect.

The differences between the two sexes seem to have changed during 1961-1980. A possible explanation of these results might be connected with the above mentioned secular trend with more rapidly developing mental maturation processes. It has been shown (Ljung, 1965 and Lindgren, 1979) that there is a so called mental spurt phenomenon taking place during a person´s development. This spurt may be comparable to the peak height velocity in physical development, which takes place close to puberty. In this respect, the secular trend means that the mental spurt occurs earlier and earlier, at lower ages, as time passes. Furthermore, we know that girls develop earlier than boys. Both these circumstances could possibly contribute to an explanation of the results presented in this study concerning changed differences between the sexes. We repeat that the differences refer to test results for thirteen-year-olds, compared over a period of 15-20 years. Thus if a greater proportion of the 1980 sample, compared to the samples of 1961 and 1966, already have

passed their mental spurt at the time of testing, this ought to show up as a higher level of test results in 1980. This is exactly what we can see in the reported average test scores. Because of the earlier maturation seen in girls, this should be more true for girls than for boys. In turn, this ought to show up as changed differences between the sexes over a 20-year period. Even this is exactly what we have observed concerning the results in our investigation.

If the tests were repeated later with the same cohorts at a higher age, the results could indicate a return to the "usul" sex differences concerning the three mental abilities. Data and analyses now available do not offer possibilities for a closer investigation of these matters. However, this is an important and interesting task for further research.

Thus, if changes in differences between the sexes could be said to have occurred in connection with policy measures in society, the same thing can not be said of differences between social groups. When we analyze our comparative results, we can observe almost parallell changes in test results over the studied 20-year-period for the two groups. That is, the differences are as big in 1980 as they were in 1961. If the equalizing measures are effective, we would expect a narrowing of the discrepancy between average scores for the two social groups, but that has not occurred. On the other hand, it is of course important to note that the differences have not grown larger either. Such increasing differences between social groups have been reported in other cases within the field of education. The positive changing tendencies in test results thus show up in the same way in both investigated and compared social groups.

At the end of our discussion we wish to comment briefly on Stahle´s (1973) discussion about the significance of the observed tendencies and differences. As differences that were found during the 1960:ies, the differences we have found are also statistically significant. Stahle puts the question if in

addition they can be said to have psychological significance. Expressed otherwise, have differences and changes reported in this study any real meaning? This question is relevant whether they may be referred to changed conditions in a broad meaning in society as a whole, or whether they can be looked upon as a result of ongoing secular trends in developmental processes. Our opinion is, that the trends over the 15-20 years of study that we have observed and reported here, logically speaking must be of both psychological and educational significance. Such on-going trends must be taken into consideration when working out curricula and while planning school work. We do not intend to go into further detail on these matters here, but refer just briefly to the continual ongoing debate about what usually is referred to as questions about individualization and differentiation.

Finally, although alarming reports concerning a decreasing level of mental ability among American youth have come, according to our comparative study of thirteen-year-old Swedish youngsters there doesn't seem to be a similar decrease of mental ability in this country. Instead, the trend seems to be in the opposite direction. But the results of our rather preliminary and rough comparisions show that it is worthwhile to follow what is happening in these matters as time goes by. As we already have stated in the introduction, it is rather unique to have access to results from identical tests on representative samples at different historical points of time. If there are trends of changes in levels and/or structures of mental ability in a population, it is obvious that it is a matter of processes occuring over long periods of time. Because of their longitudinal and sequential design, the Individual Statistics and UGU-projects offer possibilities of studying the prevalence of such processes.

Further possibilities of continued comparative studies will exist in 1985, when the younger cohort sample in the UGU-project - born in 1972 - will be tested at the age, and with the same tests as in the study reported here. Then we will be able to see

whether clear trends that have been observed here will turn up in the same way, or if we can observe other kinds of changes and/or patterns. Analyzing the test results from this younger cohort will also make it possible to relate intra-individual comparisons on mental ability to inter-individual ones. Individuals from this later sample were namely also tested at the age of ten. The tests that were used then are in very close agreement to those used on the thirteen-year-olds, at least concerning verbal and spatial abilities. Results from these intra-individual comparisons ought to indicate if the discussion on developmental trends given above is reasonable. Do the results support the more speculative thought about whether secular trends in combination with spurt phenomenons in developmental processes can explain the observed changes in level of mental ability over time? Or don't they support this thought?

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